# Beam Enable Module

June 18, 2008

R. Florian

The Beam Enable Module is used to determine the width of the Linac beam pulse, and also weather it is ok to send beam down the Linac. This is accomplished by the use of a programmable prom chip. The chip has two (2) enable inputs, eight (8) address inputs, and four (4) output bits. There are two boards in the module and each board has one prom chip. The boards are able to handle different voltage inputs for status.

The way it works:

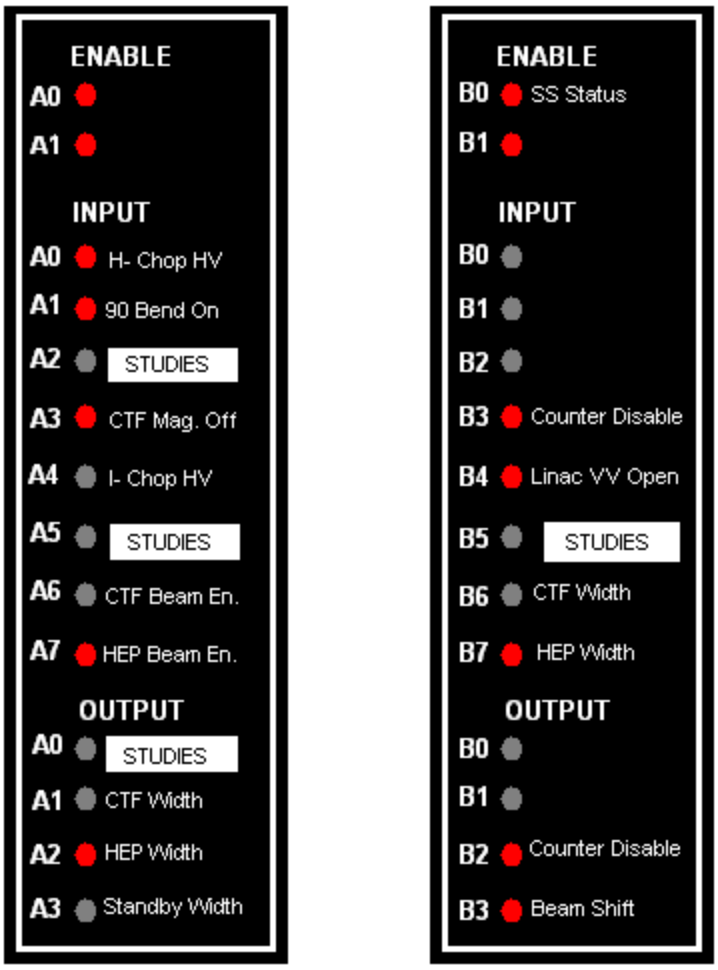
Different status signals and request signals come into the boards. The prom chips are programmed to look at the different status/request and based on this, enable different outputs. The first board (Level A) is use to check which source is being use for beam. It also checks which type of beam request is being made. If the inputs are in their correct state a chopper width is selected on one of the four (4) outputs. These outputs are sent to another module that determines which set (on/off) of timing pulses are sent to the chopper. The second board (Level B) also receives the four (4) outputs from Level A. Then if the input status bits are in the correct state, it sets an output bit to the Shifter* which allows beam down the Linac.

The next few pictures will show how the LED's should be lit. There are three (3) different types of beam request. HEP, this is a request for any physics beam for the Booster. CTF, this is for the Neutron Treatment Facility. STUDIES, this is for Linac studies and the Linac beam goes to the Linac dump.

The pictures start on page 2:

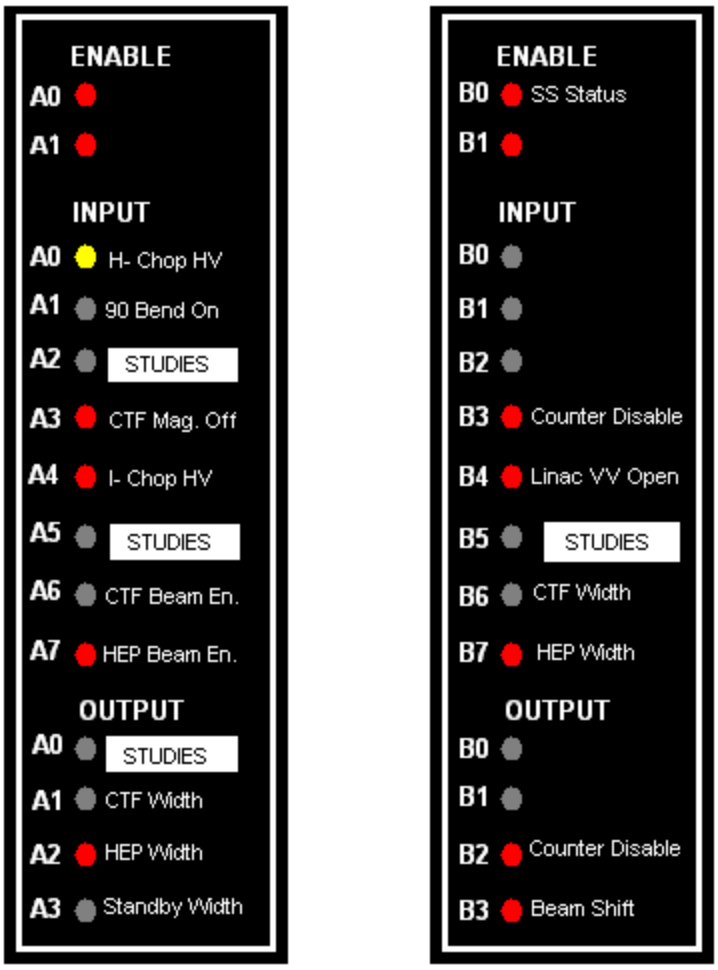
- The Shifter is a module that has a timing pulse as an input. If there is a beam request the Shifter passes the pulse to the source, and the source is then in sync with the Linac RF. If there is no beam request it delays the pulse one (1) millisecond later, therefore the source is out of sync with the Linac RF and there will be no beam down the Linac.

# H- HEP Beam Request




This is a H- HEP beam request. To have a Shifter enable the H- chopper High Voltage must be on, the 90 degree bend magnet power supply must be on and the CTF magnet must be off. The HEP beam request comes from the Beam Switch Sum Box (BSSB) in the Main Control Room. The HEP width is selected and if the Linac Vacuum valves are open the enable is sent to the Shifter. Also the Counter Disable allows the Shifter to pass more than thirteen (13) beam pulses down the Linac.

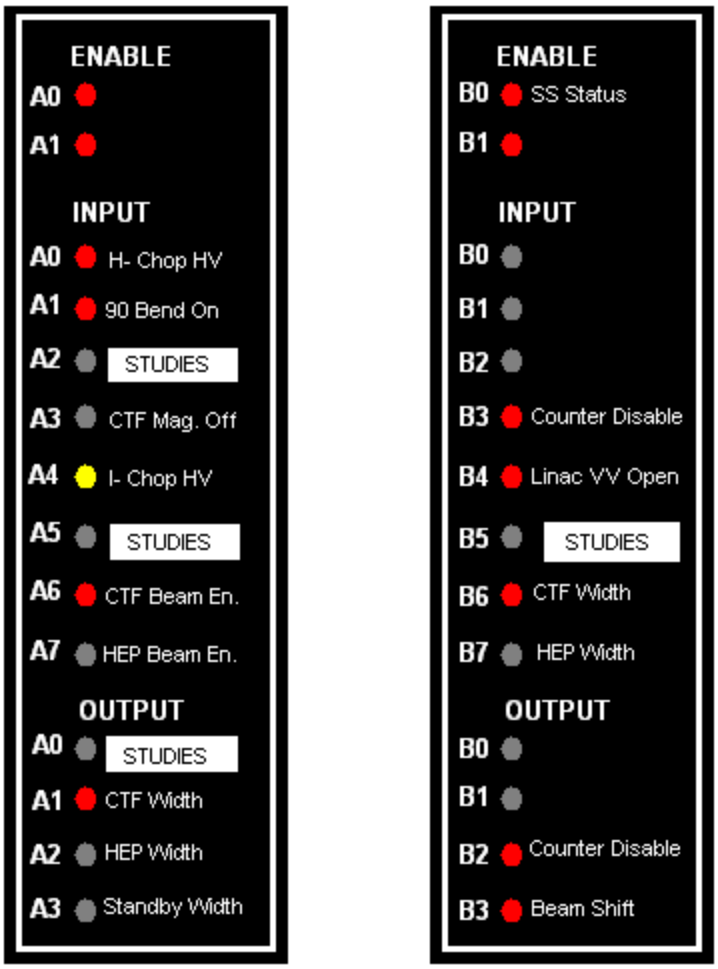
# I- HEP Beam Request




LED may be on or off

This is a I- HEP beam request. To have a Shifter enable the 90 degree magnet supply must be off, the CTF magnet must be off, and the I- Chopper High Voltage must be on. The same HEP request comes from the BSSB. The A0 LED can be either on or off for this request. The same pulse width is requested and Level B has the same status as in the H- request.

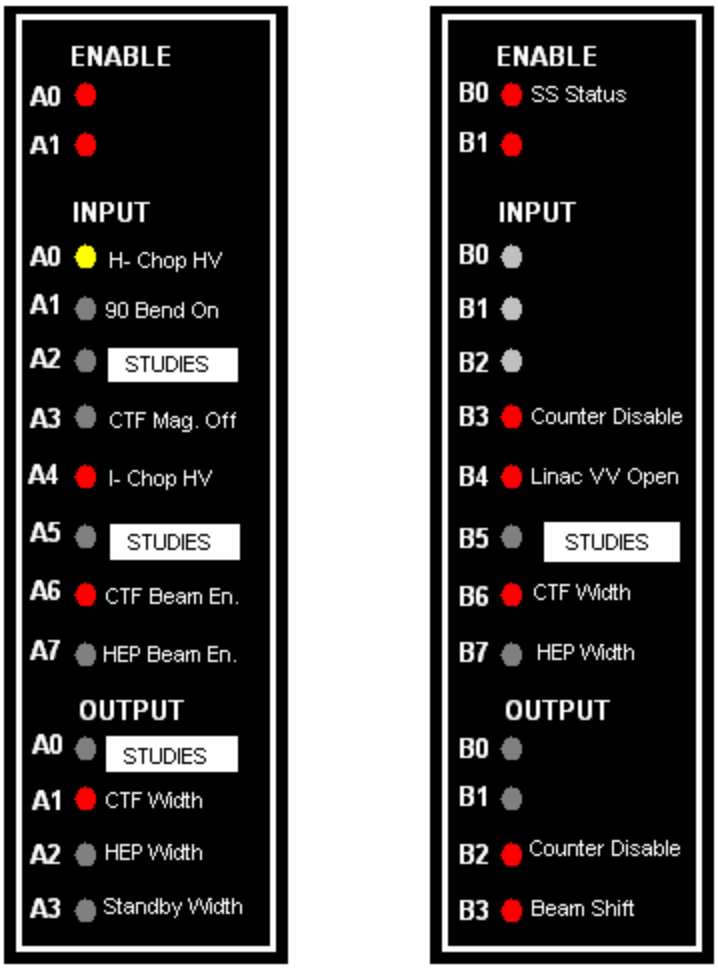
# H- CTF Beam Request




 LED may be on or off

This is a H- CTF beam request. To have a Shifter enable the H- Chopper High Voltage must be on, the 90 degree power supply must be on, and the CTF magnet must be on. The CTF Beam request comes from the Interlock Box at the Neutron Treatment Facility. The Counter is disabled because CTF can request 15 Hz. Beam.

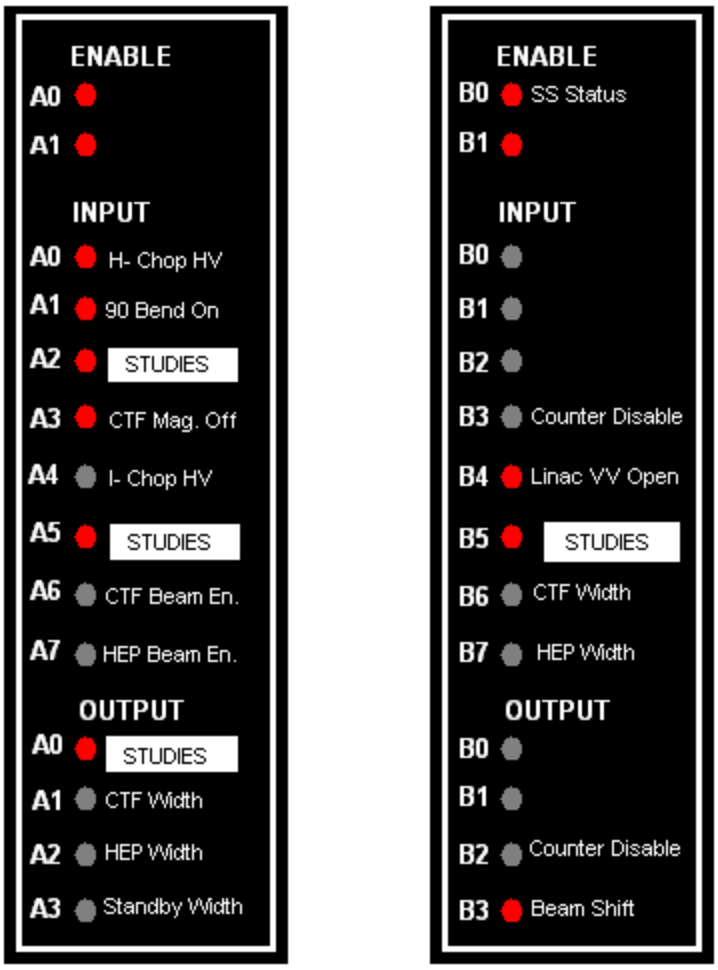
# I- CTF Beam Request




 LED may be on or off

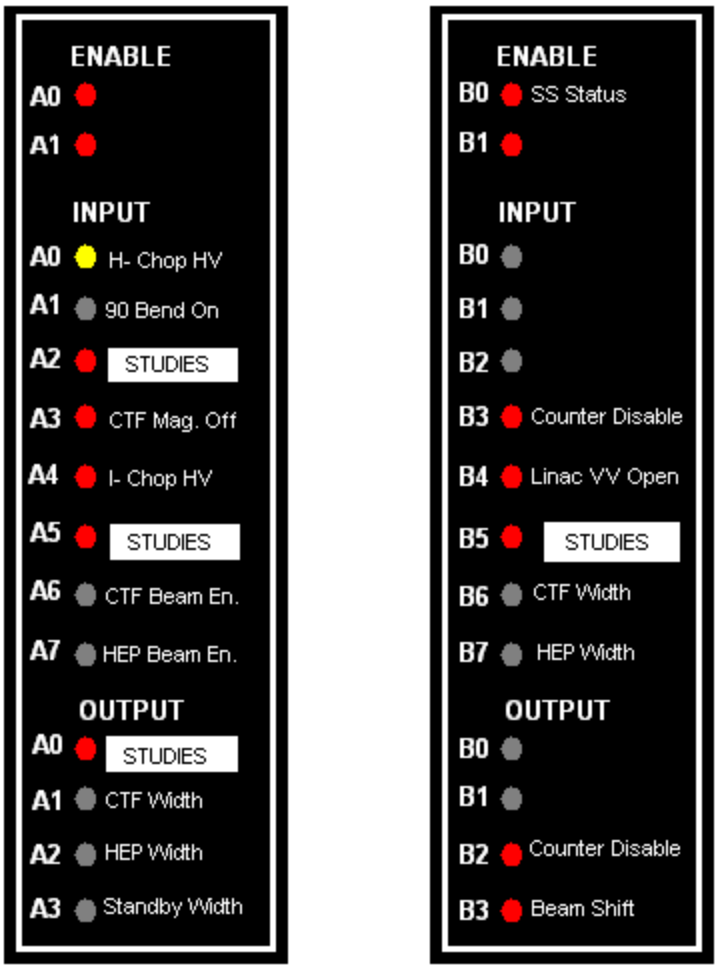
This is a I- CTF beam request. To have a Shifter Enable the 90 degree power supply must be off, the CTF magnet must be on, and the I- Chopper High Voltage must be on. The rest of the request is the same as H-.

# H- Studies Beam Request




This is a H- STUDIES beam request. To have a Shifter Enable the H- Chopper High Voltage must be on, the 90 degree power supply must be on, and the CTF magnet must be off. The STUDIES request comes from the BSSB. There is a rep-rate generator in the Main Control Room that determines the rate of the STUDIES pulses.

# I- Studies Beam Request




LED may be on or off

This is a I- STUDIES beam request. To have a Shifter Enable the H- Chopper High Voltage can be off or on, the 90 degree power supply must be off, and the CTF magnet must be off. The STUDIES request comes from the BSSB. The Counter Disable can be off or on depending on the rate of the STUDIES pulses.